A MODERN ASPECT OF THE TREATMENT OF ULCUS VENTRICULI.

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A. *Prophylaxis.* In the prevention of ulcer of the stomach, universal rules, as in certain contagious diseases, cannot be laid down because no one factor can be held responsible for the occurrence of the ulcer. In this disease prophylaxis begins at a time when the patient presents himself with gastric symptoms, indicating the existence of hypersecretion or hyperacidity, and in some cases predominating motility disturbances. When such symptoms are allowed to persist, ulcer of the stomach may develop.

Our first duty is to determine the etiological factors of his complaint, and from a clinical standpoint the following points must be taken into consideration:

1. Status of the individual.
   (*a*) Sthenic.
   (*b*) Asthenic.
2. Local intra-abdominal diseases, like chronic appendicitis, cholelithiasis, obstipation.
3. Focal infections.

1. *Status.* As to the sthenic type (status apoplecticus) it is not an uncommon experience to have well-preserved, healthy looking individuals (mostly men) complain of pyrosis, and even moderate pains two or three hours after a meal, of fulness relieved by belching. These symptoms are aggravated by hurried eating, especially if quality or quantity of food is disregarded. These people are particularly troubled because previously they had enjoyed unusual privileges on the part of the gastro-intestinal tract. They ate at all hours, gulping down a heavy lunch and hurrying back to perform hard duties of a mental and physical sort. Suddenly they begin to notice that mental and physical rest, moderate observation of diet and restraint in the use of heavy cigars become necessary to their well-being.

Such a symptom-complex may indicate the real pre-ulcerative stage, and it is our duty not to look lightly upon the complaints. The patient must be told that the functions of his stomach have exceeded the point of accommodation to abuses, and from now on his mode of life must be regulated in order to prevent the formation of an ulcer in the stomach. The symptoms are to be controlled by a non-irritating, easily digested diet, allowing only milk, eggs, thin cereals, toast and butter for four or five days, gradually adding

vegetables in purée form, boiled chicken, lamb chops, veal, ham and cooked fruits. His future mode of life must be mapped out.

In our experience such individuals are much benefited by two substantial meals taken at home morning and evening. During the lunch-hour crackers and milk, or tea with milk, or zoölak, not very cold, and zwieback should suffice to satisfy hunger.

The breakfast should consist of orange juice or grapefruit, or baked apples with cream, or stewed peaches with cream, eggs in any form (except hard boiled), cereals, bread and butter, and weak coffee, cocoa, tea or milk.

The evening meal may include the following:

Grapefruit, oysters, vegetable, noodle or barley soup, not spiced, fish plainly cooked or fried in butter.

Meats: Lamb, steak (well done), roast beef, chicken, veal, cooked ham, or white of turkey.

Vegetables: Fresh green vegetables cooked, salads, potatoes, stewed fruit.

Light puddings, cream cheese and Vichy water. We must not allow spicy substances, nor duck, goose, canned goods, coarse vegetables, excess of sweets or ice-cold drinks.

From the hygienic standpoint the patient must be told to eat slowly and at regular intervals, taking a short rest after the evening meal, and to smoke moderately. He should utilize his week-ends for complete relaxation and spend the summer vacation at a spa (Saratoga, etc.).

Asthenic Type. In contradistinction to the type just described, when the ulcer is the outcome of continuous local irritation, there is the asthenic type (habitus Stiller), in which physical inferiority predisposes to ulcer. Here, while fulness and distress after meals and sour eructation are of a frequent and troublesome nature, the more or less indefinite and negligible objective findings outside of the status and hyperacidity cause the physician to look lightly upon the complaint. Overfeeding, with indifference as to quality on the one hand, or extreme care, resulting in still greater loss of weight as well as the existing vagotonia, finally lead to ulcer. This group may also include the chlorotic girl, with tendency to ulcer, partially because of the anemia and probably because of her perversion in the selection of sour, spicy food as well as chalk.

The method of preventive treatment depends on the general condition of the patient. If not very much run down we first restrict fluids, allowing food in semisolid form of a non-irritating character, in smaller quantities and at more frequent intervals. The dietetic regime may be laid out as follows:

Breakfast. Cereals cooked in milk in a double boiler, prepared thick and taken with butter; 1 to 2 eggs, soft boiled or scrambled; toast with butter; 150 gr. of cocoa or milk or tea with milk. At 10 A.M. a cup of warm milk.

Noon. Chopped or minced meats boiled or fried in butter (chicken, pigeons, veal, lamb); fresh green vegetables cooked and in purée form (spinach, carrots, asparagus tips, cauliflower, green peas, string beans, turnips); light pudding, apple-sauce and toast. At 4 P.M. a cup of warm milk.

7 P.M. Same as breakfast, including a baked apple and cream cheese. Before retiring, another cup of warm milk.

For patients who are very much run down a modified Weir Mitchell rest cure should be insisted upon from the start. The modification consists in not using a milk diet exclusively for the four to six weeks of treatment and not an absolute confinement to bed for longer than three or four days. Furthermore, the four to six weeks of treatment should serve as an education to the patient in taking care of his digestive organs in particular and mode of living in general.

During the first three or four days, while in bed, 6 ounces of warm milk and 2 ounces of sweet cream are given every two hours from 8 A.M. to 10 P.M. When there is aversion to the excessive intake of milk we add to the milk at every second or third feeding weak tea or caffein-free coffee. Should there be a tendency to diarrhea, strained barley, rice water or cocoa may be added to the milk.

During these days a cold rub in the morning and a light massage mornings and evenings are very helpful. When bloating or tendency to constipation exists a soapsuds enema before retiring is ordered.

After four days the intervals of feeding are increased to three hours, and to every second meal we add one or two soft-boiled eggs and a thin cereal. This is continued to the end of the week, during which time the patient is allowed to walk intermittently two or three hours in the course of the day. If the symptoms have receded a more liberal diet is allowed, *i. e.*, toast and butter, mashed potatoes and at about the end of the second week the diet outlined for milder cases can be tolerated.

Patients are benefited by wearing well-fitting abdominal binders, which not only raise up the abdominal viscera but assist the tone of the abdominal wall, thereby increasing the tone of the stomach. General hygienic measures, like appropriate hydrotherapeutics and moderate exercise, must constitute an important part of the treatment. A few suggestions as to specific hydrotherapeutics may be in place. When still in a weak and helpless state cool packs, either of the entire body or of three-quarters of the body, are very beneficial, with warmth applied to the feet and cold to the head. The patient remains in the pack for one hour. The method can easily be taught to a member of the patient's family.

A thoroughly wrung-out sheet, in water of a temperature of 70° to 80° F., is spread out on a blanket, the patient is quickly wrapped in the wet sheet from neck to feet, or knees, and over this the flannel blanket is tightly wrapped.

When the patient begins to feel stronger a half-bath is ordered, at a temperature of 95°, decreasing daily until 75° to 80° is reached. He is kept in the bath for from five to ten minutes, constantly rubbing the chest. A cold towel is applied to the head. Before leaving the bath, water of 5° lower than the bath is poured over the spine. The body is quickly dried and the patient is made to rest for at least half an hour. Later on a morning shower, first of tepid and gradually cold temperature, is to be employed. A Priesnitz compress over the abdomen, to be kept overnight, is very beneficial.

The morning hydrotherapeutic measures should be carried out either on an empty stomach or half an hour after a cup of warm milk. As to drugs it is often unnecessary to use any at all. The absence of drugs is often an excellent suggestive therapeutic with an intelligent patient. It makes him feel that the disease is not serious.

When the above treatment alone does not relieve the symptoms of hyperacidity alkalies (magnes. usta and natrii bicarbon., āā 1.0 t. d.) or, if diarrhea is annoying, bismut. subcarbon., 1.0 t. d. is very useful. Because the hyperacidity in these cases is a part of the vagotonia, atropin sulphate, 0.0005, or extr. belladon., 0.02 in the form of suppositories, 2 t. d., should be given.

The nervous symptoms which are often annoying during the first or second week of the treatment, notwithstanding hydrotherapeutic procedure, may call for nerve sedatives. Bromides are usually depressing when given for a greater length of time, and may even aggravate the gastro-intestinal symptoms. Much more useful are the valerian preparations. The objection to most valerianates lies in the taste and odor. The proprietary ones, like borneval, valedol, etc., are very expensive. We found that a cold infusion served the purpose very well. It is made as follows: One teaspoonful of dried valerian roots is put into 8 ounces of hot water and allowed to stand all day. At night it is passed through a piece of gauze and taken cold with sugar. The constipation in these cases should be overcome by diet, going to stool at a regular time and, if necessary, a daily soapsuds or saline enemas.

We have endeavored to outline more or less in detail the methods of treatment in both sthenic and asthenic individuals, the application of which can result in prevention of ulcer formation. From the standpoint of prognosis it is important to point out that a sthenic individual once having shown gastric symptoms must be cautioned against indiscretions in diet for the rest of his life. With the asthenic individual (in whom the local gastric symptoms are more the result of systemic inferiority), if treatment has resulted in considerable gain in weight and a toning up of the system in general and the gastro-intestinal tract in particular the benefit may persist through the rest of his life, without any more dietetic or hygienic restrictions than the average healthy person needs.

The asthenic individual, by virtue of the above treatment, is

transformed into a person who can adapt himself to his duties and external influences, although the inborn stigmata of his habitus persist.

2. *Local Intra-abdominal Diseases.* The etiological relation of chronic appendicitis, and more rarely cholelithiasis to formation of an ulcer in the stomach, was pathologically demonstrated conclusively by Roessle, Lichtenhelt and surgically by Moynihan, Mayo and others. Some observers, among them Rosenow, hold that the mode of production of ulcer secondary to chronic appendicitis or cholelithiasis is that of infection. Roessle, von Bergman and Lichtenhelt, on the other hand, believe that sympathetic nervous irritation causes secretory and motor disturbances in the gastric mucosa, leading to local ischemia, erosion and ulcer formation.

We are of the opinion that an ulcer in the stomach is, as a rule, not the result of infection. Bacterial infection causes inflammatory changes which have different characteristics from those of the ulcer. The round peptic ulcer, with its punched-out appearance and overhanging edges, impresses one definitely that chemical, thermic or traumatic agents are the existing factors, and the primary cause is to be looked for.

In chronic appendicitis as a primary cause the conception of Roessle and Lichtenhelt is the more plausible. The clinical manifestations point to the correctness of such a conception. The local gastric symptoms, even before the ulcer exists, indicate so strongly an ulcer in the stomach that a mistake is often unavoidable.

Such pre-ulcerative symptoms in connection with chronic appendicitis can certainly not be attributed to bacterial infection. Surgical findings in cases of chronic appendicitis, or even gall-bladder trouble where the symptoms point to gastric ulcer, show in the vast number of cases an atrophied, small or obliterated appendix, sometimes containing fecoliths or other foreign bodies.

Extensive adhesions around the appendix or gall-bladder, or both, give rise to a gastric symptom-complex entirely different from ulcer. The pains are of a more continuous nature, with sensation of abdominal distention; gastric or intestinal stagnation as a result of kinks; or an open pylorus with rapid emptying because the adhesions interfere with the normal contractions of the pylorus.

Gall-bladder affections giving rise to gastric symptoms simulating ulcer and finally leading to ulcer formation also prove upon removal to be small, contracted and atrophic, with a greatly destroyed mucous membrane.

Chronic functional constipation, causing prolonged gastric hyperacidity, may finally lead to formation of ulcer.

From what has been said it seems to us plausible to assume that gastric disturbance manifesting itself clinically as hyperacidity, if reflex to a disease of intra-abdominal organs (appendix, gall-bladder, colitis or rectal or colonic constipation), the primary seat of the

affection in the organs named is mostly in the mucosa, with atrophic changes of greater or lesser degree. If the organs, on the other hand, show changes in the serosa leading to extensive adhesions the gastric symptoms are those of motility disturbance. The first class gives clinically the symptom-complex closely simulating ulcer, such as periodicity, relation of pain to quality, quantity and time of food taken, digestive hypersecretion and hyperacidity and good appetite. In the second class the gastric symptoms are pressure and distress after meals, sometimes pain, only relieved by vomiting, poor appetite, coated tongue, bad taste and sallow countenance.

The fact that the atrophic diseases of the organs named lead to gastric hyperacidity and ulcer seems to us a further proof that the bacterial invasion cannot be the primary factor in ulcer formation, but the pathological interrelation lies, as pointed out above and described by us elsewhere, in the nervous mechanism.

The foregoing discussion may be of assistance in the prophylaxis of ulcer in the stomach. In cases of hyperacidity, when the clinical diagnosis points to an appendix or gall-bladder, the removal of the diseased organs leads, in a great majority of cases, to a complete cure and prevents the formation of an ulcer.

Functional constipation causing hyperacidity must be treated appropriately in order to prevent ulcer formation. Dietetic regime is the most valuable item in the treatment. The food should be non-irritating but still bulky. Cereals well prepared (excluding rice and barley); vegetables in purée form partaken of in large quantities; fats in the form of cream, butter and olive oil, 1 tablespoonful 3 t. d. before meals, are very efficacious. Meats should be taken in small quantities, not fried or seasoned, so as not to excite excessive secretion. Fruits like baked apples or apple-sauce or fruit jellies, later peeled ripe apples, cherries, pears, plums are allowed. Because of the tendency to gastric irritation and the predominance of the descending type (spastic) of constipation it is best to avoid eating berries, because of the seeds they contain, until the gastric symptoms and objective signs of spastic constipation disappear.

As to medication, belladonna is doubly valuable, because it serves as an antacid and antispasmodic. It may be given either in powder form, as the extract, 0.01, 3 t. d., one-half hour after meals, or in suppositories, 0.02, 2 t. d. Olive oil enemata, 8 ounces, to be retained overnight, for one week every night and then every other night to the end of one month, and then once a week for another month, and finally an oil enema at night when one or two previous days show constipated movements. The evacuation of the oil, even with a satisfactory movement, should be followed by a small soapsuds or saline enema, in order to wash away the oil from the colon, thereby avoiding the irritation that may result from the fatty acids formed. Some patients are irritated by the pure oil; to avoid this the oil can be prepared with a teaspoonful of sodium bicarbonate in the form of an emulsion.

The treatment outlined, if conscientiously carried out, brings about gratifying results, so that the symptoms of hyperacidity and constipation may disappear forever. The patient is advised that the first recurrence of the symptoms will necessitate a repetition of the treatment.

The direct influence of massage on constipation, by furthering the fecal contents toward the sigmoid and rectum, has been shown by means of roentgen rays to be fallacious. Nevertheless, massage in the atonic type of constipation has a beneficial effect by raising the tone of the abdominal and intestinal musculature.

3. *Focal Infection.* As to prevention of ulcer of the stomach by the removal of focal infections, like pyorrhea alveolaris and tonsillar and prostatic infections, the undertaking is more difficult. We have already stated that our clinical conviction does not permit us fully to accept the infection theory of ulcer of the stomach. It is, however, plausible that once an ulcer is formed the healing is prevented by an infection. This might explain the seasonal exacerbation of symptoms in ulcer corresponding to the time of the year when tonsillitis is prevalent.

As a word of caution it must be emphasized that before radical measures are taken to treat the local infection—be it teeth, tonsils or prostata, we should have a positive diagnosis established by competent specialists—the bacteriologist, roentgenologist and clinician.

Internal Treatment of Ulcus Ventriculi. Since the inception of the extremely strict treatment of ulcus ventriculi as advocated by von Leube and Ziemssen, modifications have been abundant. There has hardly been a gastro-enterologist of importance who in the course of his career did not find that a modification of the original Leube treatment would be beneficial. Thus have originated useful methods, like the Bourget, Sippy, Einhorn-duodenal feeding, Lenhartz and Smithies, to be described in full. A great number of other modifications that have unfortunately flooded medical literature are not based on any scientific principle and shall not be mentioned. The modifications mentioned above, advocated and successfully carried out by experienced authorities, demonstrate to us that after all individualization, guided by proper judgment, is the only rational method.

In describing their respective methods the authors have aimed to meet the existing functional disturbances of the stomach and thereby give the ulcer a chance to heal. So have the older clinicians, von Leube, Ziemssen, Ewald, Einhorn and Boas, advocated complete rest to the stomach, which in turn would subdue secretions and acidity and stop hemorrhages if present.

Bourget, Fleiner, Sippy and J. Kauffman have chiefly aimed at neutralization of existing acidity as a most important factor in bringing about a cure.

These principles hold good in the typical cases when an ulcer in

the florid stage gives rise to either hemorrhage, excessive secretion and acidity, increased peristalsis or pylorospasm and accompanying pain. In describing the various methods of treatment we shall give our reasons why one or another method is preferable.

The more advanced diagnostic methods have taught us, however, that ulcer of the stomach exists in a fair number of cases when the above symptoms are not outspoken. In order to treat such cases successfully it is necessary to know the causative factors of the existing symptoms, and we advise the following guide:

1. Is it a bleeding ulcer (occult, profuse)?
2. Are pains, hyperacidity and hypersecretion the main existing disturbances?
3. Is the patient entirely free between attacks, so that even mental, physical and dietary excesses have no influence? or must he always be very careful, and if so, why?
4. Is the ulcer coexistent with subacidity or anacidity?

1. *Bleeding Ulcer.* A. Occult. The frequency of occurrence of occult blood in ulcus ventriculi is estimated by Boas, Kuttner and others to be much higher than that in the Mayo Clinic. Statistics have only relative value, inasmuch as the material in a surgical clinic, with predominating callous ulcers, would show a smaller number of cases with occult blood.

It is agreed, however, that the frequent demonstration of occult blood in the stool, excluding all sources of error, indicates that the ulcer is in a progressive state, and treatment almost as strict as that for profuse hemorrhage should be carried out. It is important to know that the persistence of occult blood, notwithstanding exact treatment for a few weeks, causes suspicion that malignancy exists and justifies exploratory operation.

The dietetic treatment for both occult and profuse hemorrhage will be considered together. Management of a case in the course of profuse hemorrhage needs special consideration.

B. Profuse Hemorrhage. The intensity of the treatment will depend on the severity and the effect of the bleeding. The patient should be put to bed, flat on his back and the legs of his bed elevated; an ice-bag or an ice-water coil to the abdomen and a hypodermic injection of morphin (0.005) in order to allay anxiety.

Nothing should be allowed by mouth. The thirst and dryness in the mouth should be overcome by giving the patient small pieces of ice, but allowing him to swallow very little of it. Per rectum, by way of the Murphy drop method, one pint of a Ringer solution can be given twice daily. In many cases this course of treatment alone for two or three days suffices to bring the hemorrhage to a standstill. In very weak individuals it may be necessary to give 1 pint of a 18 to 20 per cent. glucose solution per rectum on the second or third day. When the symptoms due to hemorrhage are more alarming one should immediately resort to more stringent methods.

The so-called autotransfusion, which consists in bandaging the upper and lower extremities to obstruct the venous flow but not obliterate the pulse, is very useful. The intravenous injection of 5 c.c. of a concentrated sodium chloride solution is next in importance. If further means are necessary 20 to 50 c.c. of human serum intramuscularly is to be given. Coagulose, sterilized gelatin (20 c.c.) with or without calcium intramuscularly, or per os decoction of gelatin (15 in 150), 15 grams every two hours, emetin (0.015) intramuscularly and pituitrin, 10 to 15 drops intravenously, as well as thromboplastin, can be resorted to if necessary. Adrenalin should be given if the blood-pressure is very low. Essau in Germany and Mansfield in Nebraska advocate powdered alum in glycerin (10 in 100), 1 teaspoonful every two or three hours.

Stimulation is, as a rule, unnecessary, but if indicated, camphor intramuscularly may be employed. If the bleeding is profuse, so that an immediate replacement of fluid is of vital importance, hypodermoclysis of normal saline solution or the intravenous use of the same solution is to be employed. Still better is blood transfusion, because it serves as a hemostatic and at the same time stimulates the blood-making organs.

Fleiner advises gastric lavage with ice water, Ewald with hot water and Bourget with 1 per cent. liquor ferri sesquichloride solution. Lavage, as a rule, is dangerous and but seldom indicated. In some cases, when there is nausea and frequent emesis of blood-clots, no treatment is as good as lavage, with either of the above solutions, in order to wash away the clots and give the stomach a chance to contract.

Occult bleeding needs no active hemostatic measures, as a rule; in certain cases, however, long-continued occult bleeding leads to secondary anemia of such a degree that healing of the ulcer is prevented until blood transfusion and use of sodium cacodylate (0.05 to 0.1) intramuscularly, daily for a month, is employed.

If profuse hematemesis recurs within a comparatively short time, surgical intervention is indicated after the hemorrhage has stopped and the patient is in a fit condition. As a rule, however, gastric hemorrhages due to ulcer yield to medical treatment. Only rarely does it become necessary to resort to surgical intervention because of inability to stop the bleeding.

Dietetic Regime with Bleeding Ulcer. Feeding by mouth can begin the second or third day when there is occult bleeding, in profuse bleeding a day after hematemesis has ceased and there is no nausea or vomiting. It is important to note that we must be guided at the beginning of feeding by mouth by the sensation of the patient. In marked hyperacidity and hypersecretion, notwithstanding the existence of the occult blood, the pyrosis and the hunger pain make it necessary not to discontinue feeding by mouth at all.

In active bleeding the acidity symptoms disappear or diminish

because of the neutralizing effect of the free blood on gastric secretion. Here, too, the return to feeding by mouth is governed by the sensations (pyrosis and hunger pain) of the patient. The first day when feeding by mouth is begun 2 tablespoonfuls of ice-cold certified milk is given every hour from 7 A.M. to 10 P.M., and during the night in the case the patient awakes. If this is tolerated the quantity is doubled the following day and tripled on the third day. Experience teaches that patients who otherwise had an aversion to milk welcome it and bear it well after gastric bleeding. In milk the patient has a bland, easily digested and non-irritating form of all the three articles of food, in addition to that the necessary fluids, hemostatic calcium and other salts. During this time 1 pint of 10 to 20 per cent. glucose solution can be administered by rectum in the morning after the bowels are cleansed by a soapsuds enema and 1 to 2 pints normal saline by the drip method.

Hamburger prefers the use of plain lukewarm water per rectum, claiming that additions like glucose or salt may reflexly irritate the stomach. We see no reason for this overanxiety, our experience justifying the belief that a physiological salt solution or a glucose solution is absorbed better and is much less apt to cause irritation of the colon than plain water.

During these three days the ice-bag can be removed and a Priesnitz compress substituted, to be changed every twelve hours. On the fourth and fifth days we allow 200 gm. lukewarm milk every two hours from 6 A.M. to 10 P.M.; to every second feeding 2 tablespoonfuls of sweet cream are added to the milk. If the patient has no complaints we extend the intervals of feeding to three hours, 200 gm. of lukewarm milk and 50 gm. of sweet cream, and every second feeding add two soft-boiled eggs. This is given for the sixth and seventh day.

If there is no gastric discomfort (burning, light pain) the Priesnitz compress is sufficient; when there is some discomfort hot flaxseed poultices or a hot-water bag can be applied to the epigastrium for one or two hours, morning and afternoon.

If seven days after bleeding the patient is perfectly comfortable the following diet can be ordered for the second week:

Eighth and Ninth days:

7 A.M. 200 gm. milk and 50 gm. of sweet cream with sugar.

9 A.M. Farina cooked in milk in double boiler, served as a pap.
1 soft-boiled egg.
1 slice of dry toast with butter.

12 M. 2 soft-boiled eggs.
Oatmeal cooked in milk in a double boiler for two hours and served strained with butter.
1 slice of dry toast with butter.

3 P.M. 200 gm. of milk.
50 gm. of sweet cream.
2 zwiebacks with butter.

6 P.M. Rice cooked in milk for two hours in a double boiler.
2 soft-boiled eggs.
2 slices of toast and butter.
9 P.M. 200 gm. milk.
50 gm. cream.
Zwcibacks if desired.

If the patient awakens in the course of the night he can be served with 200 gm. of milk.

Tenth, eleventh and twelfth days:

7 A.M. 200 gm. of milk.
50 gm. of cream.
3 zwcibacks with butter.
9 A.M. Farina prepared as above.
1 scrambled egg.
2 slices of toast with butter.
12 M. 50 gm. of either minced veal fried in butter, minced lamb, or minced chicken.
2 tablespoonfuls of mashed potatoes with butter.
Spinach or carrots in purée form.
2 slices of toast with butter.
4 P.M. 200 gm. of milk.
50 gm. of cream.
3 zwcibacks with butter.
7 P.M. Cereals.
2 soft-boiled eggs.
2 slices of toast and butter.
Spinach or carrots.
10 P.M. 1 cup of warm milk.

Thirteenth and fourteenth days:

7 A.M. Milk and cream.
2 zwcibacks.
9 A.M. Cereal.
2 soft-boiled or scrambled eggs.
Toast and butter.
12 M. 100 gm. thickly prepared and strained barley soup.
75 gm. scraped beef or chopped chicken or calf's brain or boiled fish.
100 gm. mashed potatoes, spinach, carrots or green peas or the flowers of cauliflower, all in purée form.
50 gm. farina or rice pudding.
1 stick toast if desired.
4 P.M. 200 gm. milk with 50 gm. of cream, flavored with cocoa if desired.
3 zwcibacks with butter.
7 P.M. 2 eggs (soft-boiled).
Toast and butter.
Custard.
10 P.M. Milk and cream.

At the beginning of the third week after the hemorrhage the patient is allowed to leave the bed with the understanding that he must rest the greater part of the day reclining on a couch.

Diet for third week:

7 A.M. Milk-cream and toast (flavored with cocoa if desired).

9 A.M. Cereals.
2 soft-boiled or scrambled eggs.
Dry toast and butter.

12.30 Cereal; soup; meats—such as chicken, fish, veal, lamb, 100 gm., and if patient can chew well the meat must not be chopped.
100 gm. mashed potatoes with butter.
Vegetables as in preceding week.
Apple-sauce and light puddings.

4 P.M. Milk or cocoa or light coffee or tea with milk and zwiebacks.

7 P.M. Eggs or boiled unsalted and lean ham.
Cream cheese.
Custard.
Toast, butter, cooked vegetable.

10 P.M. Milk and cream.

The second and third week the patient is overfed, with the object of replacing the weight lost, and if possible he should even gain weight.

During the fourth and fifth week the patient is allowed to leave the house for short walks; short rests are enforced after light meals and one or two hours' rest after the chief meals.

Diet is the same as in the third week, with larger quantities if desired by the patient. The following additions are allowed:

Vegetables: Baked potatoes, asparagus tips, string beans, Brussels sprouts.

Fruits: Prunes in purée form, cooked cherries, cooked pears in purée form.

White bread one day old and not toasted.

During the sixth week longer walks are allowed and one hour's rest only is required after the main meal. The diet is so arranged as to be fully suitable to the time when the patient is allowed to follow his occupation.

He gets his first meal at 8 A.M., consisting of a baked apple with sweet cream, 2 eggs, cereal, roll with butter, light coffee, tea or cocoa.

Noon meal depends on whether the patient has two hours' time, so as to take his main meal and rest an hour after, or only one hour, necessitating a light lunch.

Medicinal treatment, when feeding by mouth, is begun on a fasting stomach, 10 to 20 gm. of bismuth subnitrate thoroughly mixed in 150 gm. non-sparkling carbonated water (Vichy Celestins)

sipped slowly a half-hour before breakfast. Such a mixture serves as an antacid, is mildly hemostatic and coats the stomach.

After each feeding the Bourget method of using alkalies has been found by us to be very efficacious. Bourget reasoned that a solution of bicarbonate of soda when given on a full stomach passes through the fold of Retzius directly to the pylorus into the duodenum, from whence it regulates the opening of the pylorus, overcoming the spasm and causing a more rapid emptying of the stomach.

This property of bicarbonate of soda solution indicates that the antacid effect of the drug does not lie in its concentration but in its reflex action from the duodenum. It is therefore not necessary to use bicarbonate of soda in doses large enough to neutralize all the acid, which would be injurious. Bourget found that 1 per cent. of bicarbonate of soda solution is enough to diminish the acidity and overcome the spasm of the pylorus. This is administered not only at the height of acidity but whenever the patient has pain or pyrosis. It is given well diluted, to be sipped slowly from one-half to one hour after light meals and one to two hours after a heavy meal.

The original formula is the following:

Sod. bicarb., I,
Sod. phosph., 0.3,
Sod. sulph., 0.2,

to be dissolved in a half glass of water. If this method of administering the alkaline treatment is not fully sufficient to overcome pyrosis or pylorospasm it may alternately be replaced by the following powder:

Natr. bicarb., 1,
Magnes carb., 0.5,
Natrii citrici, 0.5,

dissolved in a half glass of water and administered as above.

If, on account of the excessive milk and the alkalies, diarrhea is troublesome we can, besides the morning dose of bismuth, add 1 of bismuth to every second powder.

If constipation is the troublesome factor the morning dose of bismuth should be reduced to half the quantity or given in suspension with olive oil. In order to improve the taste the emulsion is given in the following formula:

Bismut. subnitrate, 10,
Olei olivarum, 15 to 20,
Pulv. acaciæ, q. s.
Aqua amygdal., dulcis ad 100.
Sig.—To be taken every morning.

As the symptoms subside, which is usually the case at the end of the first week, the patient takes the alkaline powder in a full glass of carbonated water, one-third of which is sipped slowly a half to one hour after each meal.

In most cases the outlined medicinal treatment suffices. Rarely

pylorospasm and pyrosis during the first few days necessitate the use of atropin sulphate, 0.0005 to 0.00075 intramuscularly twice daily or extract. belladon., 0.02 in suppositories twice daily. This is especially useful in vagotoniacs.

Of equal importance to the treatment outlined thus far is an understanding of the general management of the patient. Particular attention must be paid to the hygiene of the mouth. So long as no food by mouth is given, frequent rinsing of the mouth with a mild alkaline is very essential and chewing of paraffin wax. When feeding is begun rinsing of the mouth after each meal does away with the sour taste after taking milk.

A sponge bath should be given twice daily; passive movements and light massage are essential. We should see to it that the patient spends a restful night. Often intestinal distention is a disturbing factor and is best overcome by a saline enema before relaxing.

When the patient resumes his work the dietetic regime outlined for the sixth week should be adhered to for at least six months. Alkaline water (Vichy) should be taken after meals, 150 gm. The patient is cautioned against nervous excitement and physical overwork, and if a smoker he is made to give up or greatly reduce the use of tobacco. After the sixth month raw fruit in the form of a ripe banana, ripe apple peeled and well chewed or pears may be allowed. Fruits containing seeds, as well as spicy food and alcoholic beverages, should be interdicted.

The treatment of bleeding ulcers outlined above has proved valuable in most clinics.

In 1904 Lenhartz, of Hamburg, expressed the view that the extreme sparing diet advocated by Leube is not only not conducive to healing of the ulcer but prevents healing and may cause formation of new ulcers. The prolonged starvation, he believes, causes secondary anemia, and as the food allowed is insufficient to bind the free acid, the factors for the non-healing and formation of new ulcers are thus given.

Again, the cases of ulcer where hyperacidity, pylorospasm, benign stenosis or other gastric complications lead to secondary anemias need individualization, as described below, in order to bring about improvement or, if possible, cure.

The entire Lenhartz dietetic regime seems to us to bear criticism. Meat is allowed too early, with the idea of binding acidity. While correct in principle it is also true that meat stimulates more acid secretion, especially in the second phase of digestion (chemical phase, Babkin). In order to give plenty of calories, according to Lenhartz, eggs are given in very large quantities and in a form which must necessarily become obnoxious to the patient. He omits fat, which in the form of sweet cream is rich in calories, and diminishes acidity reflexly from the duodenum and is not irritating at all. It seems to us that for the reasons outlined the Lenhartz treatment has lost

its popularity, although it originated in the mind of such a great authority.

Patients with ulcus ventriculi who never had hemorrhages and who periodically come to us with pain, hyperacidity and hypersecretion and various degrees of motility disturbances are the cases for whom modifications in the method of treatment have not been lacking. The original strict method of von Leube that the diagnosis of ulcus ventriculi spells absolute rest in bed for from two to three weeks, and extreme caution in feeding, as outlined in cases of gastric bleeding, had to undergo changes for obvious reasons

Most authors have sought to subdue the existing functional disturbances of the stomach, thereby favoring the healing of the ulcer, and all have registered favorable statistics. Judging by the improvement of the patients they were amply justified. Lasting results were unfortunately not obtained in a marked percentage of cases, so that the validity of internal treatment of ulcer has of late been questioned. Such skepticism and reaction seem to us to arise from the fact that the therapeutic procedure and results are not preceded by investigation as to the pathological status of the ulcer when treatment is begun, and the changes that took place in the ulcer and its effect on the functions of the stomach when the patient is discharged improved or cured.

Leo Schuller and Hamburger were first to utilize the roentgen rays and other clinical methods for the study of the effects of treatment, a very worthy addition to the therapeutics of ulcus ventriculi.

In order to understand what results are to be expected of treatment we must picture to ourselves the existing pathological process. It is known that an ulcer of the stomach may exist on the mucosa and submucosa, eroding the bloodvessels and causing bleeding. This usually heals, leaving superficial scar tissue, sometimes not even recognizable on the postmortem table. If such an ulcer does not heal the destruction of larger vessels, with the resulting local thrombosis and necrosis, causes a deeper ulcer, reaching the serosa and even perforating beyond, an occurrence fortunately not frequent. It is therefore not so difficult to direct the treatment and prognosticate a bleeding ulcer. In most cases after a successful course of treatment the symptoms may never return; on the other hand, recurrence of hemorrhage indicates surgical treatment.

In chronic recurrent non-bleeding ulcers the healing process is that of connective-tissue formation. It was pointed out by Orth that ulceration may be formed on the smooth base of the newly formed tissue—an explanation for the recurrence of symptoms.

With each recurrence there is additional connective-tissue formation. In very many cases the connective-tissue formation is of moderate extent so that no stenosis results even if the ulcer is situated at either ostium of the stomach. In these cases the motility disturbances are dependent on the hypersecretion and hyperacidity.

In other cases the connective-tissue formation is excessive, resulting in stenosis if near the ostia and very marked motility disturbances if even on the lesser curvature. The pathological changes being of such a varying degree we consequently must assume that the mode of treatment would have to vary accordingly.

Of equal importance for successful therapeutic measures in ulcus ventriculi is an exact knowledge of the disturbed functions of the stomach causing the existing symptoms.

The main and most easily diagnosed class of patients who present themselves with hyperacidity, hypersecretion, pain, disturbed motility of various degrees of periodicity, etc., are best treated by one of the following methods:

First to deserve mention, because of its efficacy and simplicity and because it is based on sound reasoning and experience, is the Sippy[1] method. The underlying principle of this treatment is the complete subduing of the free HCl.

An important adjuvant to the successful medical treatment of gastric ulcer has been made by Einhorn in the form of duodenal alimentation. Methods of introduction of the tube have been described by Einhorn,[2] Gross[3] and Held, Holzknecht[4] and Lippman.

Smithies[5] has advocated a course of treatment of ulcus ventriculi which deserves mention.

The method advocated by Stone[6] consists in the avoidance of carbohydrates in order to prevent fermentation.

Of late there has been an inclination on the part of some to advocate the ambulatory treatment of ulcus ventriculi, claiming good results. We decidedly question whether many of the cases so treated were really ulcers. However, the economic condition of the patient may be such that a compromise becomes necessary, though, on general principles, this is not proper. We must be clear in our mind as to the exact underlying functional disturbances of the stomach and be assured that ambulatory treatment will yield the desired success.

Individuals suited to such treatment are mostly of the sthenic type, in whom the gastric disturbances have a tendency to disappear as soon as a bland diet is resorted to and who have long intervals of freedom from symptoms. Finally, even when the symptoms are present the chemical as well as the roentgen-ray findings show a moderate degree of disturbance.

Of what does the ambulatory treatment consist? We insist on our patient adhering strictly to the following rules:

Restriction of work as much as possible for the first two weeks; to rest for from one-half to one hour after each meal, depending on

[1] Jour. Am. Med. Assn., May 15, 1916.
[2] Med. Rec., 1910.
[3] Jour. Am. Med. Assn., August, 1915.
[4] Munch. Med. Woch., September, 1911.
[5] Am. Jour. Med. Sc., 1917, p. 54.
[6] Jour. Am. Med. Assn., January 25, and September 30, 1916.

the quantity taken; to take his meals more frequently and obey strictly as to quality and quantity. All mental excitement and bodily fatigue must be avoided. A Priesnitz compress over the abdomen should be applied overnight and a light flannel abdominal binder should be worn for the day during the cool months.

Diet: The first week, if there is marked pain, the patient is allowed, until pain subsides, lukewarm milk every three hours, daily quantity between 2½ and 3 liters. For patients who do not tolerate milk alone we may add either some lime water to the milk or, mornings and evenings when the patient is at home, add a fine cereal (hominy) to the milk. We can also increase the nutritive value of the milk by adding a half-pint of sweet cream during the twenty-four hours.

Second Week—Morning: One or two soft-boiled eggs, cereal, milk soup, one cup of milk. 10 A.M.: One cup of milk with cream, two zwiebacks and butter. Noon: One or two eggs, cereal, milk soup, one cup of milk. 4 P.M.: One cup of milk, two zwiebacks and butter. Evening: Two eggs, cereal, milk soup, milk with cream two zwiebacks and butter. 10 P.M.: One cup of milk.

Third week: Besides the foodstuffs mentioned in the first two weeks, the patient gets 60 gm. of scraped beef or minced veal, or scraped, cooked, unsalted ham, 50 gm. of mashed potatoes, or spinach or carrots in purée form and toasted white bread.

Fourth week, we add cereal puddings made with butter, milk or cream (non-flavored), and at the end of this week apple-sauce or baked apples.

Fifth week, we add to the list of meats, boiled chicken, chopped, sweetbreads or fish, and gradually increase the quantity of meat to 100 gm.

Medicinal treatment consists in the use of alkalies after meals, during the month of the treatment Karlsbad Muhlbrunn, 250 gm. taken warm one-half hour before breakfast.

Such a course of treatment, if successful, should teach the patient how to live hygienically and dietetically in order to avoid future recurrences.

The treatment outlined thus far is sometimes unsuccessful. If so, the cause is to be sought and treated, if possible. Among the determinable factors interfering with the healing of the ulcer and often causing new ulcer formation are:

1. Vagotonia.
2. Congenital or acquired enteroptosis, with its resulting atony.
3. Secondary anemia.
4. Gastric catarrh—as gastritis hyperacida or sub- or anacidity.
5. Ulcer coexistent with sub- or anacidity.
6. Benign stenosis.

1. Vagotoniacs, with their tendency to hypersecretion, hyperacidity and hyperperistalsis, even without organic disease of the

stomach, will be so much more subject to persistent gastric disturbances when ulcer has formed.

Treatment will have to be directed to the vagotonia. In addition to careful diet and necessary alkaline treatment the patient should receive appropriate hydrotherapeutic measures during treatment of the acute symptoms. Cool sponge bath in the morning or lukewarm half-bath with cool shower bath and Priesnitz compresses overnight —well-fitting abdominal binders are necessary.

Medicinally atropin sulphate (0.0005 to 0.0001), subcutaneously once or twice daily until the physiological effect is reached, or in the form of extract of belladonna, 0.01 to 0.02, in powder one hour after meals, or 0.02 to 0.03 in the form of suppositories twice daily. Belladonna and its alkaloid had a specific effect in paralyzing the vagus, thereby subduing the excessive gastric secretion and peristalsis. Vagotoniacs must adhere to a non-irritating and nourishing diet for the rest of their lives as well as to the hygienic and physical measures involved.

2. In the congenital enteroptotic it is of the utmost importance that no ambulatoric treatment be attempted. Absolute rest has here the double object of giving the ulcer a chance to heal and at the same time letting the patient gain in weight—an indispensable factor in these cases.

During the first few days frequent feedings (one or two hourly) are not desirable, as the motility is very markedly delayed. As retention of food is a greater factor in exciting secretions than the largest doses of alkalies can neutralize it is obvious that the small quantities of food (two or three ounces) every three hours for the first three or four days is the better plan. When we proceed with larger quantities it is best to administer the food in the form of semisolids like thickly prepared cereals in milk, later vegetable purée; during the third week scraped beef or chopped meats, and later jellies, cooked fruit in purée form, etc. Emphasis is especially laid on the use of more solid food because excessive amounts of fluid (as is the case with milk diet) cause sagging and more loss of tone of the stomach musculature.

Lying on the right side after each meal for half an hour will facilitate the emptying of the stomach. If during the first week, notwithstanding the small quantities of food taken, there are signs of gastric retention, lavage of the stomach with one-half to one pint of alkaline water is to be employed, to be entirely returned, mornings and before retiring, for the first two or three days. For another two days, mornings only, using but half a pint of water, and, if necessary, for another two or three days the dry method of lavage (Boas), which consists in the introduction of the tube and obtaining the contents by expression.

Medicinally: Tonic treatment in the form of iron, arsenic and strychnin or phosphor, arsenic and strypsin (serum neurasthenique) intramuscularly.

The acquired gastro- or gastro-enteroptosis is due to the fact that the patient cannot or fears to partake of sufficient food for an extended length of time. The resulting gastric symptoms are more due to the existing atony of the stomach than to the ulcer proper. Prolonged unsuccessful treatment for ulcer leads both patient and attending physician to despondency, and surgical intervention is advised. When the tone of the stomach is lost surgical treatment for the ulcer does not, as a rule, yield the desired results. The treatment in general corresponds to that outlined for congenital cases.

Prognosis as to improvement of the tonus is here very much better than in the congenital type. Well-fitting abdominal binders are very useful in both varieties.

3. Secondary Anemia. Patients with atony of the stomach secondary to ulcer often present themselves with marked secondary anemia, so that the hemoglobin may be as low as 50 per cent., even 40 per cent. Here active treatment by means of one or more blood transfusions must be instituted. Treatment that ignores the anemia not only fails to heal the old ulcer but is even conducive to formation of new ulcers.

4. Gastric Catarrh. There are cases in which we find in addition to the ulcer definite evidence of coexisting gastric catarrh. In most of these sub- or even anacidity is present; in a lesser number hyperacidity is found. This catarrh, as mentioned elsewhere, may be the result of stagnation and fermentation, of food secondary to the ulcer or the individual afflicted with the ulcer has at the same time a circulatory or metabolic disease or an alcoholic gastritis. When the catarrh is directly secondary to the ulcer the outlined ulcer cure, with modifications to be mentioned, is very beneficial.

In sub- or anacidities large doses of alkalies are superfluous. The alkaline saline waters are beneficial and given in the following manner: Mornings, one-half to one hour before breakfast, 300 to 400 gm. of an alkaline sodium chloride water (Homburg, Karlsbad, Sprudel or Hawthorn Saratoga water) taken hot serves as an autolavage. Half the dose can be taken half an hour before supper. If this alone is not sufficient, lavage of the fasting stomach with 1 or 2 pints of a normal saline solution may be resorted to for about a week.

Meats should not be allowed in any form until all symptoms have disappeared, and then for a long time only finely chopped, because mucus even in small quantities interferes with chymification.

After meals, calcium carbon, 0.3, is to be given. HCl should not be employed, notwithstanding the low acidity, nor should spicy or irritating foodstuffs be allowed, as in achylia or ordinary gastritis anacida.

When hyperacidity is a factor the alkaline treatment, as outlined by Sippy, is very efficacious. In addition an alkaline water (350 to 400 gm.) on a fasting stomach, and half the morning quantity at

5 P.M. for one month, or lavage of the fasting stomach with an alkaline solution.

When metabolic or circulatory disease, besides the ulcer, is responsible for the catarrh the ulcer cure alone will only bring partial benefit unless appropriate curative measures are taken.

In these cases an annual spa cure is highly recommended, for one month, with mild saline waters for sub- or anacidity, and alkaline water when hyperacidity exists. When the patient cannot afford a spa, home treatment should be substituted.

5. For patients with ulcus ventriculi who present themselves with sub- or anacidity without catarrh, treatment must be modified according to the underlying cause of the condition. This sub- or anacidity has been attributed by most authors to a tiring of the peptic glands, due to their prolonged hyperactive secretions. This theory is plausible but cannot be proved.

We believe, as mentioned elsewhere[7] that other factors may be responsible for the sub- or anacidity. Vagotoniacs often change during or after middle life into sympathicotoniacs, so that hyperacidity (vagotonia) during early adult life changes to sub- or anacidity (sympaticotonia). Another factor is extensive perigastric adhesions which when in the region of the pylorus mechanically prevent closure of same, thereby allowing the duodenal contents to regurgitate; also, adhesions to other adjacent organs diminishing contractability of the entire stomach and with this the secretions. Our reasons (sympathicotonia, adhesions) for the cause of sub- or anacidity would tend to explain why the ulcer symptoms persist notwithstanding the cessation of hyperacid secretion.

If the theory of the tiring of the peptic glands held good we ought to expect healing of the ulcer and disappearance of symptoms, which is not the case. It seems to us important to try to determine the causative factors of the sub- or anacidity in order to apply proper treatment. When sympathicotonia is a factor we must direct our therapeutic attention to the nervous system. Regulation of life, hydrotherapeutics and avoidance of exciting factors are as essential as the treatment of the ulcer proper. Spicy and seasoned or irritating foods must be avoided. The diet is almost the same as for ulcer with normal or hyperacidity. If examination of the stool shows that meat is not well digested it should be given chopped and well done, or left out of the diet list for one or two days each week; fats, carbohydrates, and vegetable purée should constitute the main articles of food. HCl should not be given; an alkaline saline water (Saratoga, Homburg, etc.), can be given, a wineglassful thrice daily after meals. Parathyroid tablets (0.001 to 0.01) after meals may be tried.

When gastric adhesions are the cause of the sub- or anacidity in ulcus ventriculi the treatment of the ulcer proper must be conducted

[7] Gross, Held: Interstate Med. Jour., 1917, No. 4, vol. xxiv.

as if we were dealing with normal or hyperacidity, as already described. If symptoms persist and are more or less continuous, local heat, either in the form of hot flaxseed (applied one hour mornings before getting out of bed and one hour before retiring) or fango (applied a few times a week) or heat in the form of diathermia should be instituted. Such treatment does not break up adhesions but it helps toward restoration of the gastric functions. If it is without effect, surgery is to be resorted to.

The operative interference has its beneficial effect, chiefly through gastro-enterostomy. Separation of adhesions is often technically impossible; strenuous efforts to do so have often led to postoperative emboli, and even if successfully separated adhesions too often reform. We see therefore that favorable results in gastric adhesions are dependent on relief of abnormal tension in the stomach and functional restitution.

6. Treatment of Delayed Stomach Action. A clear understanding of the pathological condition in the stomach which causes delay in the emptying is very essential. This delay is seldom due to an indurated ulcer in the region of the pars media (tube) on the lesser curvature. An ulcer in that location causes frequent vomiting. This may be due to a pylorospasm, with relaxation of the cardia. When delay in emptying occurs with an induration in that location, atony of the gastric musculature, with accompanying fermentation and pylorospasm, are the underlying factors. In very rare cases a second indurated ulcer in the pylorus may be the cause of delayed emptying, and medical treatment rather than surgical intervention should be instituted.

An indurated ulcer in the pylorus proper is the most frequent cause of delay. Not only are cases amenable to medical treatment when but small residues are found in the stomach twelve hours after a meal, but even when twenty-four-hour and even longer retentions are encountered. The reason for this is that the exit of the food is not, in most cases, prevented by the connective tissue filling out the entire pylorus. Such conditions call absolutely for surgical intervention.

We refer to cases where the associated atony of the stomach or the marked pylorospasm or pyloritis prevents the normal passage of food into the small intestine. The treatment will depend on the degree of stagnation as determined by the known motility tests, the chemical findings and the tone of the gastric musculature as demonstrated by the roentgen rays.

In cases in which twelve hours after a Bourget-Faber meal, or a rice and raisin meal, we obtain from the fasting stomach only a moderate quantity of fluid contents holding in suspension macroscopically visible food particles, with a high acidity and non-rancid odor, the following procedure yields very effective results:

The patient is put to bed for at least one week. For the first three

days a morning lavage with ½ pint of warm bicarbonate solution (½ teaspoonful to 250 gm.) to be returned by expression is indicated. For another two days the sound should be introduced on a fasting stomach and the contents obtained by expression without lavage, the so-called dry lavage of Boas. After that, for a month or longer depending on the subjective feeling, the patient should take 250 gm. of a warm alkaline water one-half hour before breakfast, sipped slowly (autolavage).

The most important factor is a proper diet. Being aware that the grinding power of the stomach is disturbed, acid secretions increased and the passageway narrowed, food of such nature must be given as needs the least chymification, does not excite gastric secretion and can even pass the narrow pylorus. During the first week, in bed the diet must be of a nature to spare the organ, and consists of the following:

For the first three days:

7.30 A.M. (half an hour after the lavage or the alkaline water):
120 gm. parboiled skimmed milk.
40 gm. warm water.
20 gm. lime water.

9.00 A.M. 120 to 150 gm. of well-cooked and strained barley gruel.

11.00 A.M. Same as 7.30 A.M.

1.00 P.M. Cream of wheat finely suspended in skimmed milk, half-diluted in water, salt and sugar to improve the taste, 150 gm.

3.00 P.M. Same as 9 A.M.

5.00 P.M. Same as 7.30 A.M.

9.30 P.M. Same as 1 P.M.

During this time 1 pint of a 5 to 10 per cent. glucose solution can be administered per rectum by the drip method twice daily.

After the third day and to the end of the first week:

7.30 A.M. 200 gm. cocoa cooked in water and served with one-half parboiled skimmed milk.

9.30 A.M. 200 gm. barley gruel.
1 gm. soft egg (put in cold water and removed just as soon as the water has reached the boiling point).

12.30 P.M. 250 gm. cream of wheat with whole milk.

3.00 P.M. 200 gm. parboiled milk with one-half lime water.

5.00 P.M. 1 gm. egg (as above).

7.00 P.M. Cocoa (as above).
1 gm. egg.

9.30 P.M. 250 gm. parboiled milk and one-fifth lime water.

If the patient is comfortable we may allow, the last two days of the first week, 1 zwieback three times daily. After each feeding the patient should lie on his right side for half an hour to an hour.

The second week, if the patient has improved considerably, he is

allowed to leave the bed for the greater part of the day, only resting on his right side for from one-half to one hour after meals. The intervals of feeding are lengthened to three hours, and the following diet is ordered:

7.00 A.M. Alkaline water.
7.30 A.M. 250 c.c. warm parboiled milk.
1 egg.
2 slices of toast with butter.
10.30 A.M. 250 gm. strained oatmeal served with warm milk.
1 egg (soft-boiled).
1 slice of toast with butter.
1.30 P.M. A cereal cooked in milk; second half of week mashed potatoes with butter.
Spinach or carrots in purée form, butter or cream added to increase nutritive value.
1 poached egg on toast or with the spinach.
1 slice of toast.
4.30 P.M. Weak cocoa and 2 zwiebacks with butter.
7.30 P.M. A cereal with milk.
2 eggs, soft-boiled.
150 c.c. parboiled warm milk.
1 slice of toast with butter.

During the third and fourth weeks the patient may assume his occupation, but must be told to adhere strictly to all rules of diet. Alkaline water to be continued.

Breakfast: 2 soft-boiled or poached eggs; 2 slices of toast and butter; 200 gm. weak cocoa or parboiled milk.

Lunch should form the chief meal and consume at least from one to one hour and a half, including time for rest. Boiled chicken, chopped or minced veal or beef, rare and fried in butter, or soft lamb thoroughly chewed, or well-cooked fish, from 60 gm. to 120 gm., gradually increasing if condition improves. Mashed or baked potatoes, 75 to 100 gm. Carrots or spinach or cauliflower or green peas in purée form. Custard, farina, rice, tapioca pudding and apple-sauce, 50 gm.

4.00 P.M. cocoa and zwiebacks.

Supper: Cereal in milk; omelette souffle or cereal pudding, with eggs and butter. Baked apple or ripe banana, with cream, dry roll or toast.

As to medicinal treatment it is our experience that the carrying out of the above dietetic regime will not necessitate any medication. However, should pyrosis be a factor an alkaline non-sparkling Vichy (Celestins, Saratoga), one wineglassful with meals, can be given. If this alone is not effective, magnes. ustæ, 1 gm., or bicarbonate of soda, 1 gm., can be added to the water. When there is reason to believe that pylorospasm exists (vagotonia) or spastic constipation,

extract of belladonna, 0.02 in the form of suppositories, can be employed twice daily.

If anemia and general loss of tone is a factor, sodium cacodylate, with or without iron and strychnin intramuscularly (0.03 in ampoules), 25 to 30 injections; also appropriate hydrotherapeutics are of service.

After the fourth week a list should be written down of foods the patient is allowed to have. For example:

Meats: Chicken, squabs, lean fish, lamb, veal, ham non-salted and cooked, beef, white of turkey, eggs.

Vegetables: Spinach, asparagus, cauliflower, carrots, turnips, Brussels sprouts, string beans, green peas, mashed potatoes.

Fats: Butter, 40 per cent. sweet cream.

Fruits: Cooked fruit—apples, pears, prunes, peaches, cherries. Also ripe bananas, melons without seeds.

Fluids: Milk, cocoa, buttermilk, zoölack, weak coffee or tea with milk, non-sparkling alkaline waters.

Cereals: Farina, tapioca, sago, rice, oatmeal, barley, cream of wheat, cornflakes.

All meats should be served plainly cooked, broiled or fried in butter, non-spiced, quantity not to exceed 150 gm. Eggs, soft-boiled, poached or scrambled.

Vegetables: Only in purée form, with butter, milk or cream.

Fruits: Peeled, stewed or baked.

Fluids: Those named in small quantities not exceeding 200 gm.

Cereals: Well-cooked, served with milk, butter or cream or in the form of custards and puddings.

The patient should be instructed that if symptoms of discomfort set in he must report at once for examination, as by so doing only can recurrence and progression of the disease be obviated.

After the main meal, lying on the right side for at least half an hour is essential.

The quantity of fluids should be restricted and no fluid outside of milk or cocoa should be taken with meals.

A well-fitting abdominal binder is beneficial where atony is an important factor in the course of stenosis.

The more advanced class of incomplete pyloric stenosis, as the result of a callous ulcer of the pylorus, which manifests itself by marked signs of gastric stagnation, requires a still more stringent method of treatment. It must be remembered that the underlying pathological condition causing the symptoms lies as much in the hyperemic gastric mucosa and pyloritis as in the callous ulcer itself. The treatment therefore must be directed toward a complete rest of the stomach until subjective and objective symptoms disappear.

The patient should stay in bed for from three to four weeks. A thorough lavage of the stomach with a mild alkaline solution should initiate the treatment. All stagnated food, as well as the tenacious

mucus, is thereby removed. No food by mouth is allowed for at least four to seven days. During that time rectal alimentation is to be administered, more for the purpose of carrying fluid to the system than for nutrition.

Unlike the ordinary ulcer treatment we must seek to supply the patient (as a rule in a state of emaciation) with as many calories per rectum as is possible. This may be accomplished by glucose solution (10 per cent.), 1 pint twice daily, to which 1 ounce (30 gm.) of 50 per cent. alcohol can be added (Smithies). One nutritive enema should consist of peptonized milk, 1 pint, and 1 pint of 50 gm. sweet cream; 1 gm. pancreatin; 5 gm. bicarbonate of soda suspended in 1 pint of normal saline solution. This enema should be given at 8 A.M., 12 M., 4 P.M., and 9 P.M. All nutritive enemas are to be given at body temperature and by the drip method.

The first rectal feeding should be preceded by a cleansing enema. In order to prevent intestinal irritation, which is often most marked during the night, 15 to 20 drops of tincture of opium can be added to the last nutritive enema.

During the period of rectal feeding the mouth hygiene described above is to be observed. In order to quench the thirst small quantities (60 gm.) of distilled water may be allowed four or five times daily after the first lavage; if pyrosis is annoying, even during the fasting period an alkaline powder should be added to the water.

When mouth feeding is begun we must allow food only in such form as would most easily pass the pylorus, and for a time neither demand motility nor invoke digestive activity of the stomach. Carbohydrates in a fluid form are most appropriate, because they need no stomach digestion, they are nutritive, and prevent starvation acidosis even if the patient is underfed; furthermore, as carbohydrates do not bind the free acid, the latter serves to open the pylorus.

Proteins and even some fat can be administered in the form of very soft-boiled eggs, because in such form they pass the stomach at once (Cannon). Skimmed, well-diluted milk may also be allowed.

Carbohydrates are administered in the form of thin, well-prepared and strained barley soup or in the form of cream of wheat or strained oatmeal. Quantity of fluid at each feeding should not exceed 100 to 120 gm. during the first four to seven days of mouth feeding. Add to this three or four eggs either alone or shaken up in the milk.

Feeding should be given every three hours from 7 A.M. to 10 P.M., in order to give the stomach a chance to empty itself between each feeding. Lying on the right side for at least half an hour after each feeding is very essential. During this week one or two rectal feedings with glucose solution is to be continued.

If symptoms indicate that the stomach does not empty itself, causing disturbances, especially during the night, dry lavage (Boas)

before retiring, followed by a warm alkaline drink (200 gm.) to serve as an autolavage and to neutralize the acidity, is very efficacious.

If toward the end of the second week motility or secretory disturbances manifest themselves, despite careful treatment, duodenal feeding is to be employed, first ascertaining that the duodenal tube has reached the small intestine. This is continued for from ten to twelve days and followed for three or four days by a milk-cereal diet.

During the third and fourth weeks, if the condition of the patient permits, the diet list outlined for the second week in milder cases of pyloric stenosis may be used. During his stay in bed, Priesnitz compresses to the abdomen, sponge baths morning and evening and light general massage should be employed.

Medicinal: Sometimes during the first and second week the symptoms of pylorospasm necessitate atropin sulphate (0.0005 to 0.001) hypodermically twice daily, or suppositories of extract of belladonna (0.02) also twice daily.

During the last two weeks of treatment some advise the use of strych. nitr. (0.001) hypodermically once or twice a day as a muscular tonic.

After four weeks the patient is allowed to leave the bed, with directions that food taken shall be well prepared in purée form, bread toasted (preferably milk-toast), and all food is to be thoroughly chewed. Fluid should be restricted.

Feeding should be in quantities not to cause fulness after a meal and should be given every three or four hours. Lying on the right side after the main meal is very important. This meal, if possible, should be had at the noon hour. These directions ought to be adhered to for an indefinite length of time—even for life.

Gastric lavage will not be needed if the rules outlined are followed. The first signs of motility disturbance, however, call at once for a lavage before retiring (at least three hours after the last meal) and a moderate restriction of diet for a few days in order to prevent recurrence.

If the patient can afford an appropriate spa or a cure at home for four weeks every year it is very beneficial. A well-fitting abdominal binder, especially for asthenic individuals, should be ordered.

Einhorn has advocated a special instrument for stretching the stenosed pylorus. We have no experience in the use of the instrument. We feel, however, that blind stretching is not a desired surgical procedure. If the stenosis is such as to require instrumental interference, surgical intervention is the safer and by far the more rational procedure.